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AUTOMATIC DRINK VENDING MACHINE

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[There are no amendments to this patent.]

Abstract

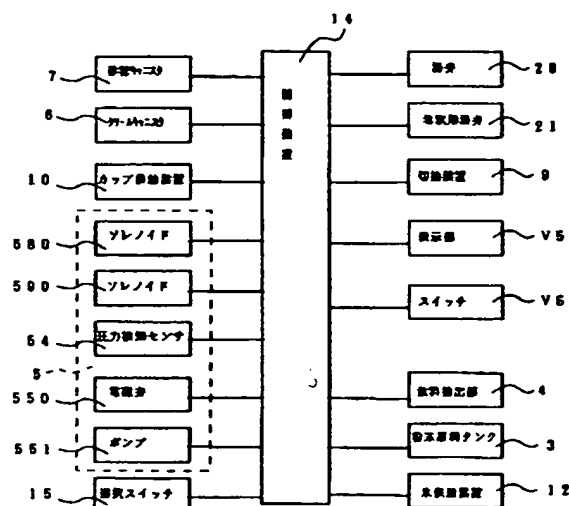
Objective

The objective of this invention is to provide a type of automatic drink vending machine that can provide a drink with concentration variable according to user request or the type of the commodity.

Constitution

A type of automatic drink vending machine characterized by the fact that it has the following parts: drink extracting unit (4) for extracting the drink, a drink feeding unit that feeds

the drink, storing device (5) that stores all the extracted drink and can feed the drink to the drink feeding unit, switch V6 that can be manipulated to select the drink concentration, and controller (14) that changes the concentration of the drink fed from storing device (5) based on manipulation of said switch V6.



- 3     Powdery feed material tank
- 4     Drink extracting unit
- 6     Cream canister
- 7     Cane sugar canister
- 9     Switching device
- 10    Cup supply device
- 12    Ice feeder
- 14    Controller
- 15    Selecting switch
- 20    Hot water valve
- 21    Diluting hot water valve
- 54    Pressure detecting sensor
- 550   Electromagnetic valve
- 551   Pump
- 580   Solenoid
- 590   Solenoid
- V5    Display unit
- V6    Switch

### Claims

1. A type of automatic drink vending machine characterized by the fact that it has the following parts: a drink extracting unit for extracting the drink, a drink feeding unit that feeds the drink, a storing device that stores all the extracted drink and can feed the drink to the drink feeding unit; a concentration selecting means that can be manipulated to select the drink

concentration, and a control means that changes the concentration of the drink fed from the storing device based on manipulation of said concentration selecting means.

2. A type of automatic drink vending machine characterized by the fact that it has the following parts: a drink extracting unit for extracting the drink, a drink feeding unit that feeds the drink, a storing device that stores all the extracted drink and can feed the drink to the drink feeding unit, a commodity selecting unit that at least can select the drink type based on the same type of feed material, and a control means that changes the concentration of the drink fed from the storing device based on manipulation of said commodity selecting unit.

3. The automatic drink vending machine described in Claim 1 or 2 characterized by the fact that change in the concentration of the drink is carried out by extracting and concentrating the drink stored in the storing device and storing the extracted drink, followed by adding diluting water as the extracted drink is fed from the storing device.

#### Detailed explanation of the invention

[0001]

##### Technical field of the invention

This invention pertains to a type of automatic drink vending machine that can extract and sell coffee, black tea, oolong tea, Japanese tea, or other drinks from feed material.

[0002]

##### Prior art

For a conventional automatic vending machine of this type, as illustrated by the extracting machine described in Japanese Kokai Patent Application No. Hei 4[1992]-354912 (A47J31/30), coffee or another drink is extracted from coffee beans or another feed material and is mixed with cane sugar, milk, etc., and the mixture is then injected into a cup for selling. Due to restrictions by the Food Hygiene Law, it is impossible to store a prescribed sale amount of the extracted drink in the automatic vending machine. Consequently, in the prior art, in each sale, drink is extracted one cup at a time for sale (extraction as demanded).

[0003]

For the aforementioned system that makes an extraction for each round of sales operation, fresh drink can be extracted and sold each time. This is an advantage. On the other hand, since a long time is needed for extraction, the customer has to wait a relatively long time (40 sec/cup) from selection of the type of drink to getting the drink. If the aforementioned Food Hygiene Law is amended, it will become possible to extract a prescribed amount of the drink beforehand and store it in the automatic vending machine, and to inject the drink into a cup for

each sale (lump extraction). In Japanese Patent Application No. Hei 5[1993]-240382 filed by this patent applicant, in the apparatus developed, a prescribed amount of drink is extracted beforehand, and it is stored with heat insulation in a drink tank as a storing device, and it is exhausted one cup at a time when sales take place. For this type of drink extracting device, it is possible to shorten the time from selection of the drink type to getting the drink.

[0004]

Problems to be solved by the invention

In the aforementioned sales system that extracts a drink one cup at a time from the feed material (extraction as demanded), after the customer selects the type of drink, extraction is carried out. Consequently, each extraction has the amount of feed material and amount hot water changed to meet the specific demand. On the other hand, for the lump extracting system, drink that has been extracted is used, so that there is no way to change the concentration of the drink.

[0005]

That is, for the system of extraction as demanded, if the drink concentration selected by the customer is higher, more feed material is used. On the other hand, if a lower concentration of drink is selected, less feed material is used. Also, for black coffee, the drink is prepared by extracting at a concentration higher than that for a drink or an ice coffee drink prepared by extracting at a lower concentration, followed by adding cane sugar and cream. This, however, cannot be realized in the system that performs lump extraction beforehand.

[0006]

The objective of this invention is to provide a type of automatic drink vending machine that can provide drinks at different concentrations as demanded by customers and corresponding to the type of commodity.

[0007]

Means for solving the problems

In order to realize the aforementioned objective, the first invention provides a type of automatic drink vending machine characterized by the fact that it has the following parts: a drink extracting unit for extracting the drink, a drink feeding unit that feeds the drink, a storing device that stores all the extracted drink and can feed the drink to the drink feeding unit, a concentration selecting means that can be manipulated to select the drink concentration, and a control means that changes the concentration of the drink fed from the storing device based on manipulation of said concentration selecting means.

[0008]

The second invention provides a type of automatic drink vending machine characterized by the fact that it has the following parts: a drink extracting unit for extracting the drink, a drink feeding unit that feeds the drink, a storing device that stores all the extracted drink and can feed the drink to the drink feeding unit, a commodity selecting unit that at least can select the drink type based on the same type of feed material, and a control means that changes the concentration of the drink fed from the storing device based on manipulation of said commodity selecting unit.

[0009]

The third invention is characterized by the fact that change in the concentration of the drink is carried out by extracting and concentrating the drink stored in the storing device and storing the extracted drink, followed by adding diluting water as the extracted drink is fed from the storing device.

[0010]

#### Embodiment of the invention

In the following, the automatic vending machine of this invention will be explained with reference to annexed figures. This automatic vending machine can provide cups of coffee or other drinks prepared inside the automatic vending machine to customers. As shown in Figure 5, based on the amount of cash loaded in cash processing device V1 set on main body V of the automatic vending machine and the selection made on commodity selecting unit V2, the drink prepared using preparing unit (1) to be explained later is sent out to sales port V3 for selling to the customer.

[0011]

The commodity that can be selected by means of commodity selecting unit V2 can be selected and varied appropriately. In this application example, it is possible at least to select among black coffee, coffee added with cane sugar and cream, and ice coffee for the same type of feed material contained in batch device (5) to be explained later. V4 is a concentration selecting means that can set and change the concentration of coffee corresponding to the desire of the customer, and it is manipulated to adjust the concentration of coffee.

[0012]

In this application example, it is possible to make changes in 5 steps with a setting value at  $\pm 0$  and an increase/decrease in two steps in each direction. In the upper section, there is a

display unit that displays the state after change by means of 5 display lamps V5 in the lateral direction. In the lower section, there are 5 switches V6 set corresponding to said display unit V5. Usually, the customer selects coffee with the present concentration. Consequently, the central display lamp is ON to display the preset value of  $\pm 0$ . Then, if the customer manipulates a change in the concentration, the corresponding display lamp is turned ON.

[0013]

Figure 1 is an oblique view illustrating the constitution of the drink preparing unit. As shown in this figure, in this drink preparing unit (1), there are the following parts: hot water tank (2) for storing hot water prepared by heating feed water, drink extracting unit (4) for extracting a drink by mixing hot water fed from hot water tank (2) with the feed material from powdery feed material tank (3) that contains coffee feed material powder or the like, batch device (5) as a storing device for storing and containing the extracted drink, cream canister (6) for containing cream as an additive feed material to be added to the extracted drink, cane sugar canister (7) for containing cane sugar as an additive feed material, mixing bowl (8) for mixing said cane sugar, cream and hot water from said hot water tank (2) with said drink, switching device (9) that is switched so that the drink extracted in drink extracting unit (4) is guided to batch device (5) or directly to mixing bowl (8) or to disposal bucket (13), cup supply device (10) for supplying cup C, cup receiving table (11) for setting cup C at a position corresponding to vending port V3, ice feeder (12) that feeds ice into cup C when an ice drink is selected, and disposal bucket (13) set beneath cup receiving table (11).

[0014]

The drink feeding unit is for providing a drink to the customer. In this embodiment, drink is fed through mixing bowl (8) into cup C supplied from cup supply unit (10). Also, when cane sugar, cream, and other additive feed materials are not used, the drink may be directly fed to the cup through a tube set for direct feeding to the cup.

[0015]

For hot water tank (2), water is fed through a cistern (not shown in the figure) for storing tap water and a water feeding pipe (not shown in the figure) that is set on the downstream side of the cistern for pressurizing water in the cistern. By means of a heater not shown in the figure, hot water tank (2) heats the water fed to it to form hot water at 90°C or higher, and it stores the prepared hot water. The hot water stored in hot water tank (2) is then fed through hot water valve (20) to drink extracting unit (4). Also, hot water is fed through diluting hot water valve (21) to mixing bowl (8).

[0016]

Drink extracting unit (4) has agitating chamber (40) for mixing and agitating the powdery feed material and hot water, extracting chamber (41) for extracting drink from the mixed and agitated mixture solution, drink receptacle (42) for receiving the extracted drink, and paper filter (43) for filtering the drink. Agitating chamber (40) has an opening portion formed on the upper portion for feeding of hot water and powdery feed material into it. Extracting chamber (41) is connected to agitating chamber (40), and drink is extracted from the fed powdery feed material and hot water. Extracting chamber (41) is opened in its lower portion, and it has paper filter (43) sandwiched between it and drink receptacle (42). As the mixture solution is filtered with paper filter (43), the drink is extracted, and the extracted drink is fed to drink receptacle (42). Said drink receptacle (42) has drink exhaust port (44). Drink exhaust port (44) is connected through drink feeding tube (45) to switching device (9). Also, in drink extracting unit (4), volumes of the various structural members are set such that drink in an amount for plural cups can be extracted in a single extracting operation. At the same time, by changing the amount of powdery feed material and the amount of hot water, it is also possible to extract drink in an amount corresponding to  $1/n$  cup unit (that is, it allows extraction of drink in an amount less than 1 cup or between 1 cup and 2 cups). In this embodiment, due to restriction in the size of the mechanism and to ensure problem-free, stable extraction, the minimum amount of extraction is set at 0.7 cup, and the maximum amount of extraction is set at 2 cups. Consequently, it allows extraction of drink in the range of 0.7-2 cups.

[0017]

By adjusting the amount of powdery feed material and the amount of hot water, it is possible to appropriately change the concentration of the extracted drink. The drink extracted for storing in batch device (5) has the highest of the concentration levels considered. In this application example, the extraction concentration is set such that the concentration obtained by increasing the concentration of ice coffee by 2 steps is the highest concentration.

[0018]

Batch device (5) is enclosed in heat insulating device (50). By means of a heater and a thermostat (not shown in the figure) to be explained later, it can keep the drink contained in it always at 65°C. The structure of the batch device contained in heat insulating device (50) can be explained with reference to Figures 2, 3 and 4. It has the following parts: drink feeding tube (91) from switching device (9), drink feeding tube (51) from batch device (5) to mixing bowl (8), drink disposal tube (52) from batch device (5) to disposal bucket (13), open tube (53) for



opening to the atmosphere, and drink storing container (57) connected to pressure detecting tube (56) that is connected to pressure detecting sensor (54) and pump portion (55). Drink storing container (57) has heater (574) on its outer peripheral surface, and it has the following parts: upper lid (570) that has an opening portion connected to said drink feeding tube (91) and open tube (53), lower cover (571) that has opening portion formed connected to said drink feeding tube (51), drink disposal tube (52) and pressure detecting tube (56), barrel portion (572) made of a thermally conductive feed material in a cylindrical shape with opened upper and lower ends, and clamp member (573) that holds barrel portion (572) by means of upper lid (57) and lower cover (571).

[0019]

Drink feeding tube (51) connected to mixing bowl (8) is made of a flexible feed material. By means of drink feeding ON/OFF device (58) to be explained later, the lower portion near lower cover (517) [sic; (571)] is pressed/deformed or not to perform ON/OFF control. Also, as atmosphere opening portion (510) is set on the lower portion near the position for pressing deformation, when drink feeding tube (51) is closed, the drink left inside drink feeding tube (51) can be exhausted.

[0020]

Drink feeding ON/OFF device (58) is composed of the following parts: solenoid (580), manipulating lever (583), which is manipulated with solenoid (580), and which has one end supported and energized downward with elastic member (581), has the other end in contact with a pressing lever to be explained later, and has a middle point pivoted for free rotation around shaft (582), and pressing lever (586), which has one end pivoted for free rotation around shaft (584) and has a middle portion driven with manipulating lever (583) in contact with it so that bent end portion (585) presses and deforms drink feeding tube (51).

[0021]

When no power is fed to solenoid (580), as shown in Figure 4, elastic member (581) energizes so that manipulating lever (583) presses pressing lever (586). In this state, pressing lever (586) presses and deforms drink feeding tube (51) to stop drink from flowing out. On the other hand, when power is turned ON for solenoid (580), as shown in Figure 3, manipulating lever (583) is pushed upward against the energizing force of elastic member (581), so that manipulating lever (583) is rotated around shaft (582), and the end portion of manipulating lever (583) releases pressing of pressing lever (586), so that the pressure of pressing lever (586) on drink disposal tube (52) [sic; drink feeding tube (51)] is released and drink flows out.

[0022]

Drink disposal tube (52) connected to disposal bucket (13) is made of a flexible feed material, and, depending on whether or not the lower portion near lower cover (517) [sic; (571)] is pressed and deformed with drink disposal ON/OFF device (59), it is turned ON/OFF. Drink disposal ON/OFF device (59) is composed of the following parts: solenoid (590), manipulating lever (593), which is manipulated with solenoid (590), and which has one end supported and energized upward with elastic member (591), has the other end in contact with a pressing lever to be explained later, and has a middle point pivoted for free rotation around shaft (592), and pressing lever (596), which has one end pivoted for free rotation around shaft (594) and has a middle portion driven with manipulating lever (593) in contact with it so that bending end portion (595) presses and deforms drink disposal tube (52).

[0023]

When no power is fed to solenoid (590), as shown in Figure 4, elastic member (591) energizes so that manipulating lever (593) presses pressing lever (596). In this state, the pressing of pressing lever (596) is released, pressing and deformation of drink feeding tube (51) [sic; drink disposal tube (52)] is released with pressing lever (596), and the drink flows out. On the other hand, when power is turned ON for solenoid (590), as shown in Figure 3, manipulating lever (593) is pushed downward against the energizing force of elastic member (591), so that manipulating lever (593) is rotated around shaft (592), and the end portion of manipulating lever (593) pushes pressing lever (596). In this state, pressing lever (596) presses and deforms drink disposal tube (52), and flow-out of drink is stopped.

[0024]

With the aforementioned constitution of drink feeding ON/OFF device (58) and drink disposal ON/OFF device (59), when both drink feeding ON/OFF device (58) and drink disposal ON/OFF device (59) are cut off from power, as shown in Figure 4, drink feeding tube (51) is closed, while drink disposal tube (52) is opened. That is, in case of power outage, etc., it is necessary to dispose of the drink, so that in case of long-time power outage, etc., no aged drink is supplied, so that a high degree of safety is realized.

[0025]

Pressure detecting sensor (54) is connected to pressure detecting tube (56) connected to the opening portion formed on lower cover (571). When drink is stored in drink storing container (57), due to the pressure of the drink, the gas inside pressure detecting tube is compressed, and

the increased pressure is detected. The opening portion formed on the lower cover is formed at the position of the bottom portion of drink storing container (57). Consequently, the pressure detected by pressure detecting sensor (54) varies in proportion to the height of the drink contained in said container. Consequently, it is possible to detect the height of the drink contained. As a result, it is possible to detect the volume of the drink contained from the detected height of the drink and the opening area of barrel portion (572) of drink storing container (57).

[0026]

Pump portion (55) is connected and branched at a middle point of pressure detecting tube (56) connected to pressure detecting sensor (54). When power is ON, connection between pressure detecting tube (56) and pump (551) is cut off with electromagnetic valve (550). Consequently, the gas inside the pressure detecting tube does not leak to the side of pump portion (55). Normally, pump portion (55) is cut off from pressure detecting tube (56) with electromagnetic valve (550). When electromagnetic valve (550) is opened, gas is taken from opening portion (552) and sent to the side of pressure detecting tube (56).

[0027]

Depending on the shape of the opening portion of lower cover (571), the compression of gas inside pressure detecting tube (56), etc., drink may invade into pressure detecting tube (56). When drink invades, it is impossible to detect the pressure inside drink storing container (57) correctly. In this case, gas is fed from pump portion (55) to blow out the drink that has entered pressure detecting tube (56).

[0028]

That is, when no drink exists inside drink storing container (57), electromagnetic valve (550) is opened, and pump (551) is turned ON to suction gas from opening portion (552), and to blow drink inside pressure detecting tube (56) into drink storing container (57). Also, in consideration of hygiene, the interior of drink storing container (57) is emptied, and is heated with heater (574), so that the interior of drink storing container (57) is dried. In this case, one may also feed gas from pump portion (55) to accelerate drying. In addition, hot water is fed into drink storing container (57), and the interior of the container is rinsed for cleaning. In this case, one may feed gas from pump portion (55) to agitate the hot water so as to enhance the cleaning effect.

[0029]

Switching device (9) is used to switch feeding of the drink from drink extracting unit (4) to batch device (5), mixing bowl (8) or disposal bucket (13). That is, it switches drink feeding tube (45) from drink extracting unit (4) to one of the following tubes: drink feeding tube (91) to batch device (5), drink feeding tube (92) to mixing bowl (8), and drink feeding tube (93) to disposal bucket (13).

[0030]

Figure 8 [sic; 6] is a block diagram illustrating controller (14) that provides overall control for said various structural portions. By manipulating selecting switch (15) as commodity selecting unit V2, controller (14) controls the various structural portions and performs sales operation. In the following, explanation will be provided on the drink extracting operation and sales operation with said constitution with reference to the block chart shown in Figure 9 [sic; 7].

[0031]

In step S1, judgment is made on whether sales are to be performed as a lump extraction system or by means of extraction as demanded. In the case of sales by means of lump extraction, sales are predicted and extraction is performed beforehand. As a result, it is possible to shorten the time since there is no need to perform extraction in each sale. This allows consecutive short-time sale operations. However, when sales are stopped for a long time, the drink has to be disposed. This is undesired. Also, one may switch the sales method. That is, one may adopt the lump extraction method for sales in a time zone when sales are carried out frequently, and adopt the extraction-as-demanded in a time zone when sales are rare. Switching may be carried out manually with a switch not shown in the figure, or automatically using a timer means or the like.

[0032]

In step S1, when it is determined that sales are performed in the lump extraction method, the process goes to step S2, in which switching device (9) is driven such that drink feeding tube (45) and drink feeding tube (91) are connected to each other. As a result, a flow path is formed so that the drink fed to switching device (9) is guided to drink feeding tube (91), and the drink fed to drink feeding tube (91) is guided to batch device (5).

[0033]

Then, in step S3, YES/NO of sales instruction is detected. In step S3, if there is a sales instruction, the process goes to step S4, and judgment is made on whether drink is contained in batch device (5). In the case of sales by means of lump extraction, as to be explained later, the

structure is such that when the drink amount decreases, extraction is performed in drink extracting unit (4) so that drink is always contained in batch device (5). However, absence of drink in batch device (5) can take place in a few cases. That is, during cleaning and drying of the interior of batch device (5), or right after the start of sales in the lump extraction mode, even when sales are performed by means of lump extraction, drink may be absent inside batch device (5).

[0034]

Detection on whether or not drink is contained is performed by controller (14) by making an overall judgment on the amount of extraction of drink extracting unit (4), the detection signal of pressure detecting sensor (54), and whether or not a cleaning mode or drying mode exists. In step S4, if it is determined that drink is contained in batch device (5), the process goes to step S8, and switching device (9) is driven to switch so that drink feeding tube (45) and drink feeding tube (92) are connected to each other.

[0035]

Consequently, drink that has been fed to switching device (9) is guided to drink feeding tube (92). A path is formed so that the drink fed to drink feeding tube (92) is guided to mixing bowl (8). Then, the process goes to step S9, and sales-on-demand is carried out. That is, while lump extraction is performed using drink extracting unit (4), the additive feed materials are added for sale.

[0036]

More specifically, from powdery feed material tank (3), powdery feed material corresponding to one cup of coffee at a concentration as instructed and, from hot water tank (2), hot water corresponding to one cup of coffee as instructed are fed into agitating chamber (40) of drink extracting unit (4). Then, the mixture of the powdery feed material and hot water agitated in agitating chamber (40) is fed into extracting chamber (41). Under pressure using a pressurizing means not shown in the figure, filtering is performed with paper filter (43), and the extracted drink is fed to drink receptacle (42). The drink extracted in drink receptacle (42) is fed through drink exhaust port (44) to switching device (9) by means of drink feeding tube (45). While drink is fed from drink feeding tube (92) to mixing bowl (8), cane sugar is exhausted as additive feed material from cane sugar canister (7), and cream is exhausted as additive feed material from cream canister (6) corresponding to the instructions for the drink. Also, the drink agitated in mixing bowl (8) may be fed while ice is fed from ice feeder (12) into cup C when the instructed drink is a cup of ice coffee.

[0037]

In the following, explanation will be provided on the operation of feeding-out from batch device (5) in the case of sales after lump extraction in step S5 when it is determined that there is drink in batch device (5) in step S4. Also, in the following, detailed explanation is provided on the sales operation of drink in step S5 with reference to the flow chart of the sub-routine shown in Figure 8 [sic; 7]. First of all, depending on the state of setting of switch V6 as concentration selecting means V4, the value for correcting the amount of drink fed from batch device (5) is determined. That is, in step S11, the adjusting amount b is set at 0 as the initial set value. Then, in step S12, a judgment is made on whether there is adjustment in concentration using concentration selecting means V4. If NO, the process goes to step S20 while the adjusting amount is 0. When the judgment is YES for adjustment in step S12, the process goes to step S13, and a judgment is made on whether said adjustment is an increase or decrease. When an increase is determined in step S13, the process goes to step S14, in which a judgment is made on whether said adjustment has 2 steps or 1 step. If it has 2 steps, the process goes to step S16, and the adjustment amount b is set at +20 g. On the other hand, if it has 1 step, the process goes to step S17, and the adjustment amount b is set at +10 g. In step S13, if it is determined to be a decrease, the process goes to step S15, in which a judgment is made on whether said adjustment has 2 steps or 1 step. If it has 2 steps, the process goes to step S19, and the adjustment amount is set at -20 g. If it has 1 step, the process goes to step S18, and the adjustment amount is set at -10 g. Then, the process goes to step S20.

[0038]

In step S20, depending on the type of drink sent from batch device (5), the amount of drink fed from batch device (5) is determined. That is, if the drink selected is black coffee, the process goes to step S21, in which the drink in an amount of 100 g plus adjustment amount b g is fed through drink feeding tube (51) to mixing bowl (8), and the process goes to step S24. In this step, diluting hot water valve (21) from hot water tank (2) is opened, and the amount of hot water is reduced by adjustment amount b g from 40 g (when the adjustment amount is minus, the amount [of the water] is increased by the adjustment amount) as it is fed to mixing bowl (8). Consequently, 140 g of the drink obtained by mixing with hot water are fed.

[0039]

Then, in step S20, if the selected drink is ice coffee, the process goes to step S22. In this step, the drink in an amount of 50 g plus adjustment amount b g is fed through drink feeding tube (51) to mixing bowl (8). Then, the process goes to step S25, and, as diluting hot water valve (21) from hot water tank (2) is opened, hot water in an amount of 20 g minus adjustment amount b g

is fed to mixing bowl (8). Consequently, 70 g of drink prepared by mixing with hot water are fed. In step S27, if the drink selected is ice coffee, 70 g of ice fed from ice feeder (12) are fed, and 140 g of drink are provided.

[0040]

Then, in step S20, if the selected drink is ice coffee containing cane sugar and cream, the process goes to step S23, and the drink in an amount of 110 g plus adjustment amount b g is fed through drink feeding tube (51) to mixing bowl (8). The process then goes to step S26, and as diluting hot water valve (21) from hot water tank (2) is opened, hot water in an amount of 30 g minus adjustment amount b g is fed to mixing bowl (8). Consequently, 140 g of the drink prepared by mixing with hot water are provided. In step S27, if the selected drink is coffee containing cane sugar and cream, cream is fed from cream canister (6) and cane sugar is fed from cane sugar canister (7) to provide a drink containing cane sugar and cream.

[0041]

For the beverage supplied from batch device (5), power is turned ON for a prescribed time to solenoid (580) of drink feeding ON/OFF device (58), manipulating lever (583) is driven, and pressing of pressing lever (586) on drink feeding tube (51) is released, and a prescribed amount of drink is fed to drink feeding tube (51). After said prescribed time, power is turned OFF for solenoid (58), and manipulating lever (583) is pulled back by elastic member (581), pressing lever (586) is pressed, and pressing lever (586) again presses drink feeding tube (51), and feeding of the drink is shut off. Consequently, by changing the prescribed time with controller (14), one can change the amount of drink fed out to batch device (5) at will.

[0042]

In this application example, by means of the treatment in steps S3, S4 and S5, if there is a sales instruction and there is drink inside batch device (5), the drink is fed from batch device (5). However, when the customer manipulates the selecting switch to instruct sales by means of extraction as demanded (not shown in the figure), whether there is drink for sale in batch device (5) or not, controller (14) drives switching device (9), and extraction as demanded is performed in the same way as that in the extraction-as-demanded mode to be explained.

[0043]

That is, in this embodiment, even in the lump extraction mode of sales, depending on the specific state, controller (14) can also choose the extraction-as-demanded mode so as to prevent a chance of loss of sales. Also, the customer may select the extraction-as-demanded mode. Then,

the process goes to step S6, and a judgment is made on whether lump extraction is to be performed. That is, when the drink contained in batch device (5) becomes less than a prescribed amount, if cleaning and drying are not carried out, it is determined that lump extraction is to be carried out.

[0044]

When lump extraction is determined, the process goes to step S7 to perform lump extraction. In the following, the lump extraction operation will be explained in detail. By means of pressure detecting sensor (54), the amount and deficiency of [drink] stored in batch device (5) are detected. Consequently, extraction may be performed in drink extracting unit (4) in a replenishing amount determined based on the deficiency. The amount of decrease in the drink in batch device (5) is not in units of cups. Instead, the amount of drink fed out is determined corresponding to selection of the concentration and the type of drink. Consequently, fractional amounts occur. As a result, control is performed to perform extraction in an amount corresponding to the fractional amount. For example, if it is determined that the replenishing amount is 1.7 cups, the amount of powdery feed material and the amount of hot water are adjusted for extraction of 1.7 cups. However, if the replenishing amount is 0.5 cup, since the minimum extraction amount is 0.7 cup, 0.7 cup is extracted to meet the demand.

[0045]

Consequently, as replenishing is made in an amount not limited to an integral number of cups, but also may be a fractional amount, it is possible to extract in a more precise amount. As explained above, powdery feed material in a prescribed amount set by the controller is fed from powdery feed material tank (3) and hot water in an amount set by the controller is fed from hot water tank (2) into agitating chamber (40) of drink extracting unit (4).

[0046]

The powdery feed material and hot water are agitated in agitating chamber (40), and the mixture is loaded in extracting chamber (41), and under pressurization using a pressurizing means, drink is filtered with paper filter (43), and it is extracted to drink receptacle (42). The drink extracted to drink receptacle (42) is fed through drink exhaust port (44) and it is fed by drink feeding tube (45) to switching device (9). In step S2, switching device (9) is driven such that switching device (9) switches to connect drink feeding tube (45) and drink feeding tube (91) with each other. Consequently, the extracted drink is fed and stored in batch device (5).



[0047]

The drink fed to batch device (5) is contained in drink storing container (57), and it is heated with heater (574) and is stored. The amount of stored drink is detected with pressure detecting sensor (54). Then, in step S1, when extraction-as-demanded mode is determined, the process goes to step S10, and, just as in said step S8, switching device (9) is driven to switch so that drink feeding tube (45) and drink feeding tube (92) are connected to each other.

[0048]

Then, in step S11, when a sales instruction is detected, the process goes to step S12, and, just as in said step S9, sales-as-demanded is carried out. That is, in this case, while extraction of a cup is carried out in drink extracting unit (4), additive feed materials are added for a sale.

[0049]

Effect of the invention

According to the first invention described above, it is possible to adjust the concentration according to the desire of the customer even for a drink that has been extracted beforehand. According to the second invention, even when the type of commodity varies for the extracted drink, it is still possible to change the concentration.

[0050]

According to the third invention, it is possible to change the concentration easily by extracting the drink at a higher concentration beforehand.

#### Brief description of the figures

Figure 1 is an oblique view illustrating the constitution of the main portion in this invention.

Figure 2 is a side cross-sectional view of the batch device of this invention.

Figure 3 is a side cross-sectional view of the batch device in this invention in the case of drink feeding.

Figure 4 is a side cross-sectional view of the batch device of this invention when a drink is disposed of.

Figure 5 is an oblique view illustrating the constitution of the automatic drink vending machine of this invention.

Figure 6 is a block diagram illustrating the controller of this invention.

Figure 7 is a flow chart of the controller of this invention in sales operation.

## Explanation of part numbers

- 2 Hot water tank
- 4 Drink extracting unit
- 5 Batch device
- 8 Mixing bowl
- 14 Controller
- V2 Commodity selecting unit
- V4 Concentration selecting means

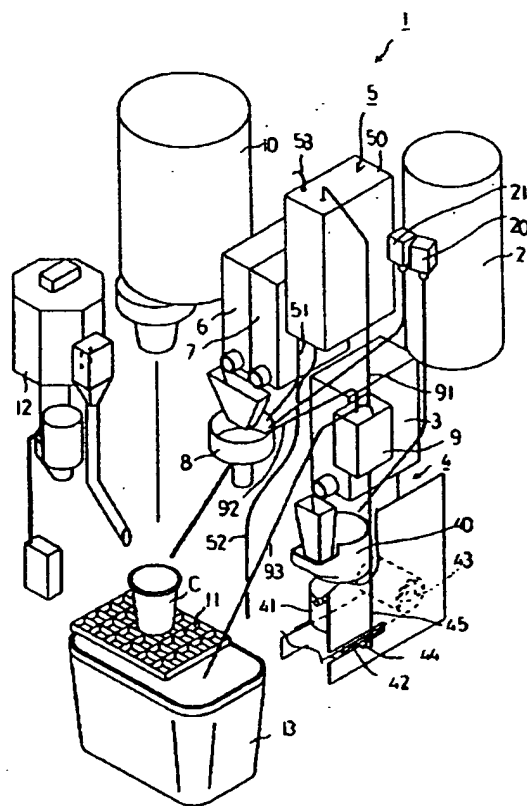


Figure 1

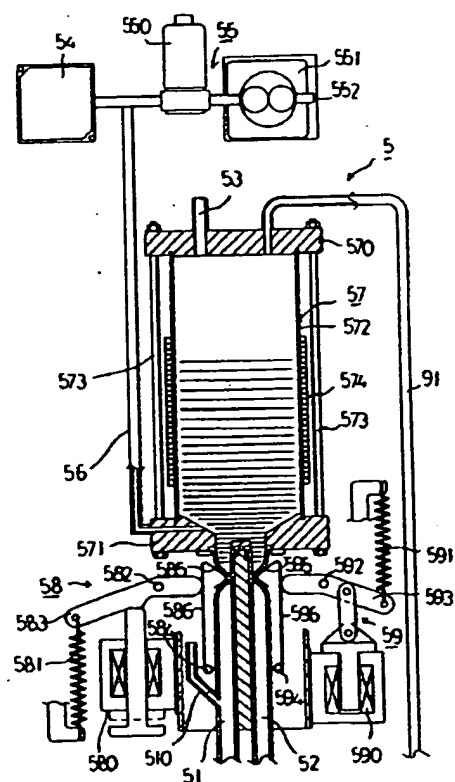


Figure 2

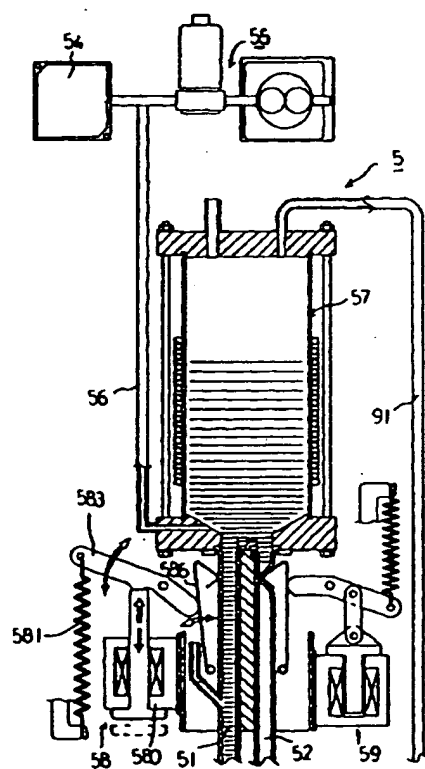


Figure 3

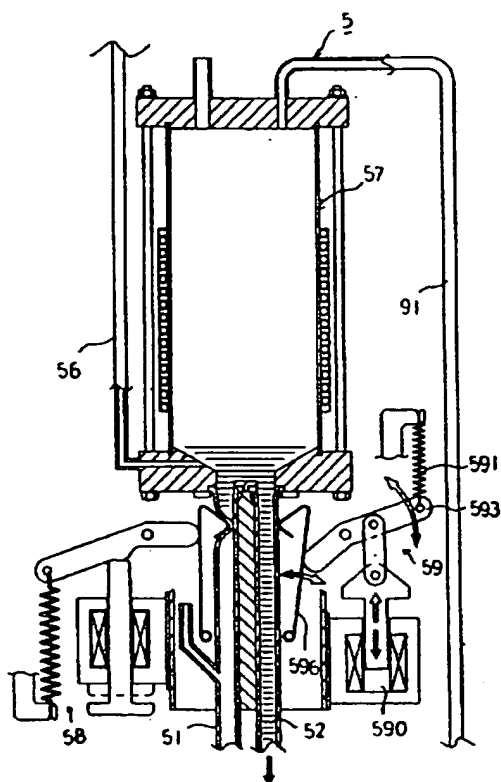


Figure 4

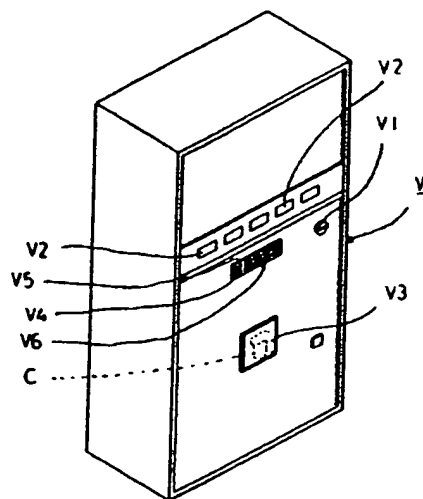


Figure 5

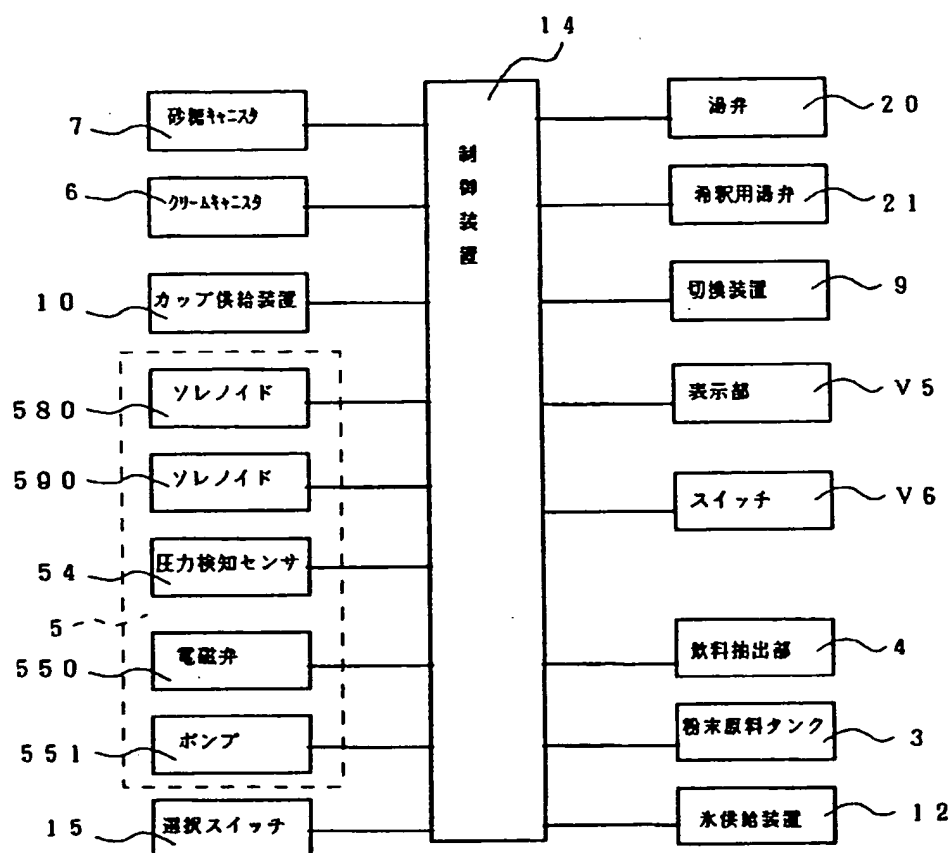


Figure 6

- Key:
- |     |                            |
|-----|----------------------------|
| 3   | Powdery feed material tank |
| 4   | Drink extracting unit      |
| 6   | Cream canister             |
| 7   | Cane sugar canister        |
| 9   | Switching device           |
| 10  | Cup supply device          |
| 12  | Ice feeder                 |
| 14  | Controller                 |
| 15  | Selecting switch           |
| 20  | Hot water valve            |
| 21  | Diluting hot water valve   |
| 54  | Pressure detecting sensor  |
| 550 | Electromagnetic valve      |
| 551 | Pump                       |
| 580 | Solenoid                   |
| 590 | Solenoid                   |
| V5  | Display unit               |
| V6  | Switch                     |

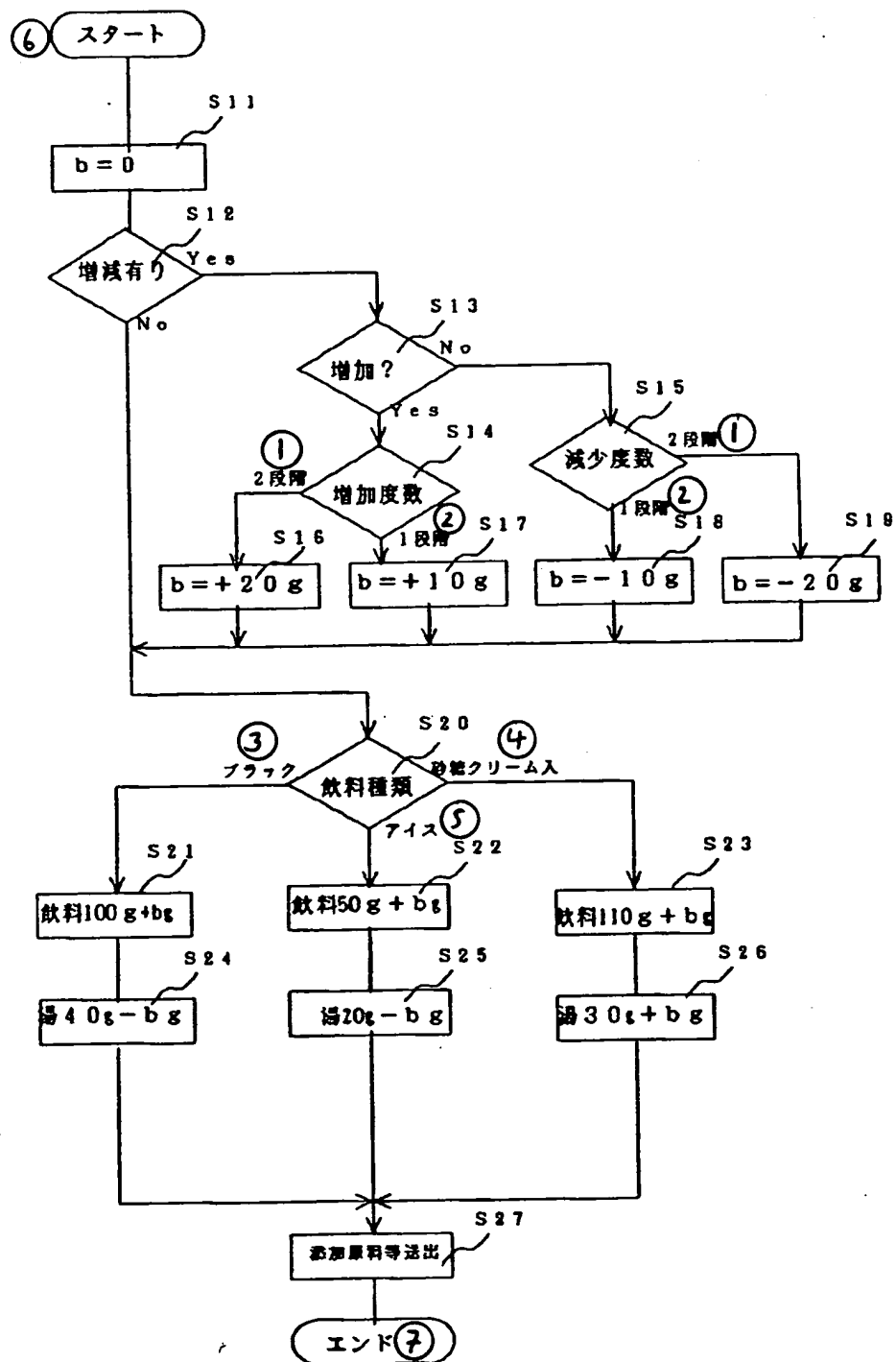


Figure 7

Key: S12 Is there adjustment?  
 S13 Increase?  
 S14 Increase degree  
 S15 Decrease degree  
 S20 Drink type  
 S21 100 g + b g of drink

- S22 50 g + b g of drink
- S23 110 g + b g of drink
- S24 40 g - b g of hot water
- S25 20 g - b g of hot water
- S26 30 g + b g of hot water
- S27 Feed-out of additive feed materials, etc.
- 1 2 steps
- 2 1 step
- 3 Black coffee
- 4 Coffee containing cane sugar and cream
- 5 Ice coffee
- 6 START
- 7 END